

STANDARD MICROSYSTEMS CORPORATION

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OVERVIEW

ARCNET is a baseband, token-passing local area network (LAN) technology offering easy interconnection, flexible topology, outstanding reliability, high throughput and a proven track record.

Originally developed in 1977, ARCNET has evolved into a mature, cost-effective technology with a large installed user base. Today there are almost two million ARCNET nodes installed worldwide. Within the PC LAN market alone, ARCNET represents 20% of the installed base and continues to command 20% of all new installations.

The reason for ARCNET's success is, in a word, **reliability**. According to network installers,

"Network software installs more easily and with fewer problems when the LAN technology is ARCNET."

In addition, ARCNET performs all network protocol functions to allow more efficient operation with minimum computer overhead.

ARCNET is one of the easiest LANs to install:

- ▲ simple interconnect rules
- ▲ very few restrictions

ARCNET offers a choice of transmission media:

- ▲ traditional coax cable
- ▲ economical twisted pair, alone or in combination with installed IBM Type 1 or Type 2 cabling
- ▲ duplex fiber optic cable for increased security and greater distances

ARCNET offers a choice of wiring layouts:

- ▲ star topology for ease of troubleshooting
- ▲ economical bus or daisy-chain configurations

ARCNET offers tremendous flexibility:

- ▲ all topologies and media types can easily coexist in a single network

ARCNET networks are easily modified:

- ▲ ARCNET controller chip enables workstations to join and leave the network without disrupting network activity
- ▲ ARCNET's flexible topology makes it easy to add workstations to the network or to move them to other locations

ARCNET offers ease of troubleshooting:

- ▲ inherent feature of star topology's point-to-point connections
- ▲ assisted by diagnostic LEDs on hubs and easy-to-use diagnostic tools

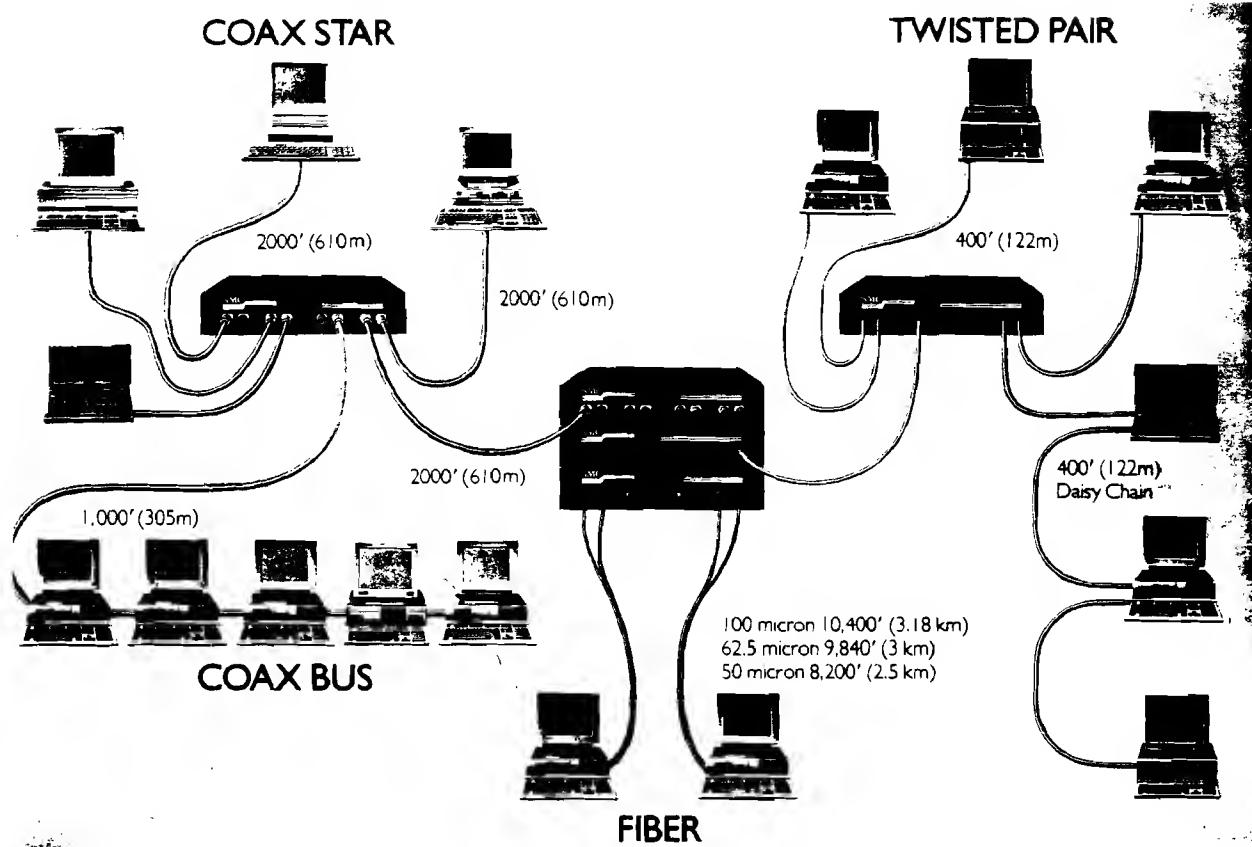
ARCNET is based on a token-passing protocol:

- ▲ token-passing guarantees equal access to the network for all workstations
- ▲ token-passing is deterministic, thereby assuring a constant and predictable throughput

ARCNET supports up to 255 workstations per network:

- ▲ larger networks are easily configured by internal bridging at the file server

ARCNET CONNECTIVITY



Flexible Topology

ARCNET's topology is extremely flexible and forgiving. With only a few simple interconnect rules and no hub hierarchy or restrictions on hub placement, it's exceptionally easy to configure an ARCNET network correctly. Basically, no matter how it's hooked up, it *will work*.

An SMC ARCNET network can be wired in a simple star, bus or daisy-chain. These simple wiring layouts can be easily combined into a complex, free-form topology which includes coax, twisted pair and fiber optic products.

This ability to combine all the topologies and every ARCNET product into a single network provides greater flexibility for the network designer, as well as cost savings for the customer. And ARCNET products do not become obsolete. The newer products are compatible with the older ones, so all of SMC's ARCNET products can be combined in a single network.

With ARCNET, you can connect all the workstations in an office, on an entire floor, in the whole building, and even from one building to another. An ARCNET network can stretch for up to four

miles, so distance is almost never an issue.

ARCNET's flexible topology makes it easy to add or relocate workstations, too. And, since the reconfigurations take place automatically, workstations join and leave the network smoothly. This flexibility is a major reason for ARCNET's popularity and outstanding reputation for reliability.

Numerous Wiring Choices

ARCNET operates with all the popular transmission media: coax, twisted pair, IBM Type 1 / Type 2 and a variety of duplex fiber optic cables. Each has its own set of advantages.

Coax, the only available media for ARCNET networks until recently, offers a degree of reliability that comes from a long and established track record. It features both outstanding electrical and mechanical characteristics at a relatively economical price.

Twisted pair telephone-type wiring is low in cost, readily available, light in weight and easy to install. Overall network installation costs can be reduced still further by using existing wiring, rather than rewiring the site.

IBM's Type 1 / Type 2 cabling is typically used to pre-wire sites in anticipation of future Token Ring™ installations. SMC's Type 1 / Type 2 products allow users to maintain their substantial wiring investment while taking advantage of ARCNET's lower equipment costs.

Fiber offers increased security, is safer in hazardous environments, provides immunity to electromagnetic and radio frequency interference and allows greater distances between workstations. These extended distances also provide excellent solutions for building-to-building connections.

Coax Star Network

ARCNET's popularity is based on its classical star topology. This topology offers the reliability of point-to-point wiring along with the flexibility of the distributed star.

Star networks, with their generous point-to-point distances of up to 2,000 feet (610m), are recommended for connecting widely separated workstations. And they are well-suited to pre-wiring of the site. Just place an Active Hub in a central location, and run the coax cables.

To expand a star network, simply join hubs together. SMC's Active Hubs can be stacked and then cascaded via their rear panel interconnect system, or they can be linked point-to-point by running a cable from an open port on one hub to an open port on another hub.

Coax Bus Network

Although ideal for starter networks – those having no more than eight workstations – the newer bus topology also serves as an extension of ARCNET's popular star topology.

With a bus network, workstations are connected directly to the cable with BNC T-Connectors. Each bus cable supports a maximum of eight workstations, and can be up to 1,000 feet (305m) in length. This configuration, which eliminates the cost of a hub and uses less cable, is recommended for modular offices and classrooms where there are clusters of closely situated workstations.

As the network grows, pairs of bus cables can be joined with Active Links. Or, for even greater flexibility and economy, multiple bus cables can be connected to a single Active Hub, effectively combining star and bus topologies.

As long as the T-Connectors remain in place, workstations can be powered down and even removed from the network without affecting network operation.

Twisted Pair Network

SMC's twisted pair network adheres to ARCNET's classical distributed star with its central hub and reliable point-to-point connections. For additional flexibility, workstations may also be wired in a daisy-chain configuration (a layout similar to a coax bus network). With a daisy-chain, up to ten workstations can be connected directly to a wire segment.

Featuring point-to-point and end-to-end distances of up to 400 feet (122m), SMC's twisted pair network requires only a single pair of unshielded, 100 ohm twisted pair wires. This telephone-type wiring is a cost-effective alternative to coax cable. To further reduce installation costs, the wire pair can be connected to an unused pair of wires from the telephone bundle.

The star configuration, like the coax star, can be expanded by cascading or linking Twisted Pair Active Hubs. Also, pairs of daisy-chains can be joined with Twisted Pair Repeaters, which are similar to the Active Links used for coax bus topology. For added flexibility and economy, multiple daisy-chained wire segments can be connected to a Twisted Pair Active Hub.

Type 1 / Type 2 Network

SMC's Type 1 / Type 2 network supports star and daisy-chain wiring layouts identical to the ones used with SMC's twisted pair network. The major difference is a special Type 1 / Type 2 Active Hub designed to utilize the 150 ohm twisted pair wiring needed for connection to IBM's Type 1, 2, 6, 8 or 9 cabling. By substituting 150 ohm wiring and using a 150 ohm terminator, SMC's twisted pair products can be used with the Type 1 / Type 2 Hub.

Optical Network

SMC's optical network supports the most popular types of duplex fiber optic cable in use today – 50, 62.5 and 100 micron core – and offers greater point-to-point distances (up to 10,400 feet or 3.18km) than any other type of media. This network utilizes ARCNET's traditional star topology with its central hub and reliable point-to-point connections.

The Big Picture

As shown in the above illustration, all the topologies and transmission media can be combined into one network simply by stacking and cascading the various types of Active Hubs – coax, twisted pair, Type 1 / Type 2 and optical.